Analox 101D2 Portable - Oxygen Monitor

User Manual

Analox Ltd.
15 Ellerbeck Court, Stokesley Business Park
North Yorkshire, TS9 5PT, UK
T: +44 (0)1642 711400 **F:** +44 (0)1642 713900
W: www.analox.net **E:** info@analox.net

+44 7917 764348

This support line is closed on UK public holidays

List of Contents

1 Introduction 3
2 Controls 4
3 Battery Check 5
4 Calibration 6
5 Alarm Operation 7
6 Alarm Setting 8
7 Sensor Replacement 9
8 Trouble shooting 10
9 Specifications 14
10 Analox Oxygen Compensation Chart 15

1 Introduction

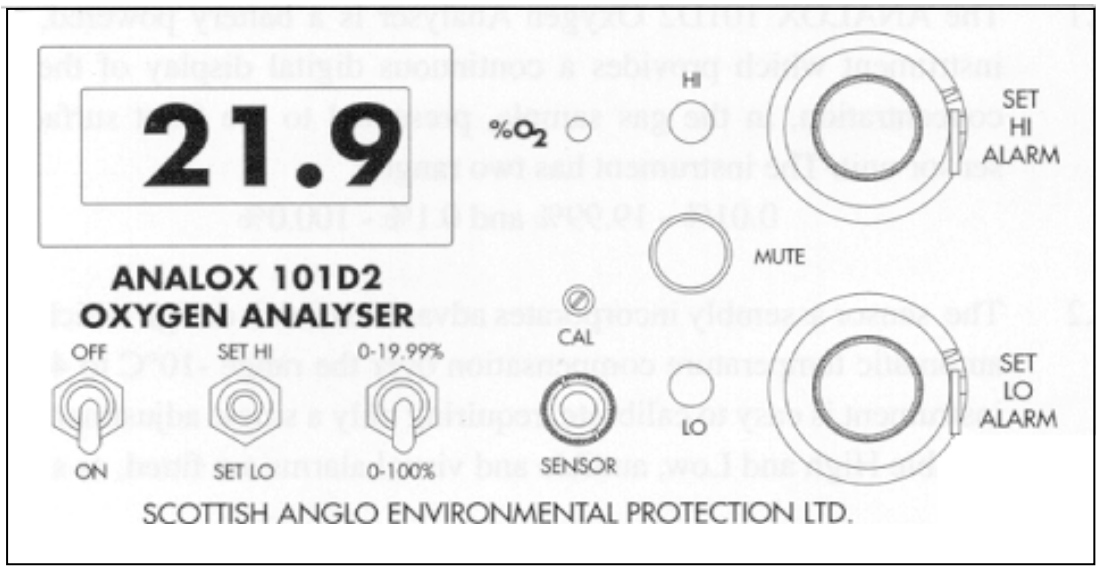
1.1.1 The ANALOX 101D2 Oxygen Analyser is a battery powered, portable instrument which provides a continuous digital display of the Oxygen concentration, in the gas sample, presented to the front surface of the sensor unit. The instrument has two ranges:

0.01% - 19.99% and 0.1% - 100.0%

1.1.2 The sensor assembly incorporates advanced circuit design which provides automatic temperature compensation over the range -10°C to 40°C. The instrument is easy to calibrate, requiring only a single adjustment and user settable High and Low, audible and visual alarms are fitted as standard.

1.1.3 Optional extra facilities can be specified at time of ordering. These include an analogue output voltage, relays which operate in alarm conditions, a 4 – 20mA Sensor Input to accommodate a remote loop powered Sensor. Transmitter. Optional extras require the fitting of the 0 – 30vDC external power facility.

2 Controls


21.9
%O2
HI
SET
HI
ALARM
MUTE
ANALOX 101D2
OXYGEN ANALYSER
CAL
OFF
SET HI
0-19.99%
ON
SET LO
0-100%
SENSOR
LO
SET
LO
ALARM
SCOTTISH ANGLO ENVIRONMENTAL PROTECTION LTD.

3 Battery Check

3.1 If the internal battery voltage falls below a pre-set threshold, approximately 5 volts, then the LCD display on the instrument front panel will alternate between its normal reading and '1888'. **The Instrument should not be used when this occurs** since the indicated value of Oxygen concentration may not be accurate.

4 Calibration

4.1 Zero Check: Select the 0 – 19.99% range using the switch on the front panel and remove the sensor jack plug, from the socket on the front panel. The LED should read 0.00 ± 0.02. This checks the instrument zero and is the same as the theoretical zero voltage output of a sensor, when it is subjected to as containing no Oxygen. Alternatively, Pure Nitrogen or Helium or other Oxygen free gas may be passed across the sensor, at a flow rate of approx. 60 Litres/Hour for about 3 minutes. The Instrument reading should not be greater than about 0.03% (300ppm), depending on the purity of the gas being used and the sensor performance.

4.2 Span Adjustment: this can be carried out in two ways.

4.2.1 Select the 0 – 100 range and expose the sensor to normal ambient atmosphere. When the reading on the display is steady, adjust the 'CAL' control on the Instrument front panel until the display reads 20.9. Turning the control clockwise will increase the reading. This completes the calibration process.

NOTE: High humidity decreases Oxygen levels in the atmosphere please refer to the humidity chart in 10.0, calibrate using procedure 4.2.2.

4.2.2 Using a known accurate Oxygen/Nitrogen gas mixture, select the range most appropriate to the gas concentration. Fit a flow adaptor to the sensor and pass the gas at a flow rate of about 60 Litres/Hour, for about 5 minutes. When the Reading on the display is steady, adjust the 'CAL' control on the front panel until the reading on the display agrees with the Oxygen concentration of the gas being used. Clockwise rotation of the control increases the reading. This completes the calibration process.

If the desired readings cannot be obtained, then it is likely that the sensor has come to the end of its life and should be replaced.

NOTE: The Instrument does not need to be calibrated on both ranges.

5 Alarm Operation

5.1 If an alarm condition occurs, the internal audible buzzer will sound intermittently and the appropriate LED will flash.

5.2 The audible alarm may then be silenced by pressing the 'MUTE' button on the front panel. If the reading is still in the alarm condition, the LED will continue to flash until the Oxygen concentration returns within the normal band. The LED will then turn off.

5.3 If an alarm condition occurs and the Oxygen concentration returns to normal before the 'MUTE' button is pressed, then the audible and visual alarms will remain active, until the 'MUTE' button is pressed. This facility allows the user to be aware of an alarm occurring whilst the instrument was unattended.

5.4 The alarms have a built-in Hysteresis of approximately 0.3% O2 to overcome nuisance alarm triggering when measuring near either set-point. This means that if a high alarm occurs with a set point of 23.0% then having acknowledged the alarm by pressing 'MUTE' button, the alarm state will not clear until the Oxygen level drops to below 22.7%

6 Alarm Setting

6.1 Before any adjustments are carried out to the 'SET ALARM' controls, the user should release the locks on the control knobs. This is done by moving the small lever located at the edge of the control downward until the knob moves freely. After adjustment the lock should be reset to prevent accidental movement.

6.2 The 'SET HI' / 'SET LO' toggle switch is normally spring biased to its central position, and in this position, displays measured Oxygen concentration. The Hi alarm trip point may be reset by moving and holding the switch upward and adjusting the 'SET HI ALARM' control until the desired set point is displayed on the LCD. The Lo alarm trip point may be reset by moving and holding the switch downward and adjusting the 'SET LO ALARM' control until the desired set point is displayed on the LCD. Alarm trip points may only be set to a resolution of 0.1% O2. If the instrument is being used on the 0 – 19.99% range then during the adjustment procedure, the display will be automatically adjusted to read the correct resolution.

6.3 If the user only requires to check the present alarm set points, then this may be done by just pressing the 'SET HI'/'SET LO' switch to the appropriate position, and reading the value on the LCD.

7 Sensor Replacement

7.1 When the instrument can no longer be calibrated by adjustment of the 'CAL' control, it is possible that the Oxygen Sensor unit is exhausted and should be replaced.

7.2 The ANALOX 9212-4 Sensor Assembly has a life of approximately 3 years in normal air but this will be reduced if it is constantly exposed to higher concentrations of Oxygen. Conversely, if the sensor is normally exposed to lower concentrations of Oxygen, its life may be extended.

7.3 The sensor must be replaced with an Analox Oxygen sensor type 9212 – 4, as this sensor is especially manufactured for this instrument.

7.4 There are no serviceable parts in the sensor and cable assembly – the entire unit must be replaced.

7.5 The sensor in the 101 D2 is an electrochemical device and contains a caustic electrolyte. Always check to make sure that it is not leaking and do not allow it onto any part of your body or clothing. In the event that you do come into contact with the electrolyte wash the contaminated part with copious amounts of water – see safety information.

Warning

If after handling the sensor you fingers or other parts of your body feels slippery or stings, wash with a lot of water.

If stinging persists get medical attention!

8 Trouble shooting

SYMPTOM	REASON	SOLUTION
Battery Symbol	Low Battery	Change battery
LED does not read 000 ± 0.02	Requires offset adjust	See instructions in 8.1
No display	Switched off Bad connection	Switch on Check display connection Check battery connection
Zero reading	Sensor disconnected Sensor expired	Check connection Change sensor
Reading erratic	Pressure on sensor Radio transmission Sensor old or faulty Condensation on sensor	Check Flow Move unit away Change sensor Dry sensor face
Reading does not change When calibration pot is turned.	Faulty connections Sensor failure	Check connections Change sensors
Display segments missing	Display faulty	Return to dealer
Will not calibrate	Sensor faulty Sensor not in air High altitude	Change sensor Check flow adapter Calculate percent Equivalent = 20.9% bar
Reading drifts	Rapid temperature change	Do not move analyser from one temperature to another immediately before use.

8.1 Trouble shooting (continued)

8.1.1 In order to access the interior of the instrument the top cover requires removal. To remove the top cover ensure the instrument is switched off and remove the four screws located in the recesses in the base and the four rectangular rubber feet. The top cover is retained by four internal catches, which can be seen at the bottom of the rectangular holes which normally hold the rubber feet. These catches can be released by using the green tool provided with the instrument, or a suitable screwdriver. Lay the instrument on its side and insert the tool in one of the REAR holes keeping the bevelled edge toward the rear of the instrument. Whilst holding the instrument firmly, push the tool toward the top over and gently ease the rear corner of the top away from the body. Repeat the process on the other REAR CATCH. Release the front catches in a similar manner and the top cover may then be removed.

WARNING: UNDER NO CIRCUMSTANCES SHOULD ANY ADJUSTMENTS OTHER THAN THOSE OUTLINED IN THIS PROCEDURE BE MADE TO OTHER CONTROLS IN THE INSTRUMENT. ANY ALTERATION OF OTHER CONTROLS WILL AFFECT THE OPERATION AND ACCURACY OF THE INSTRUMENT AND THE SUPPLIER CANNOT BE HELD RESPONSIBLE.

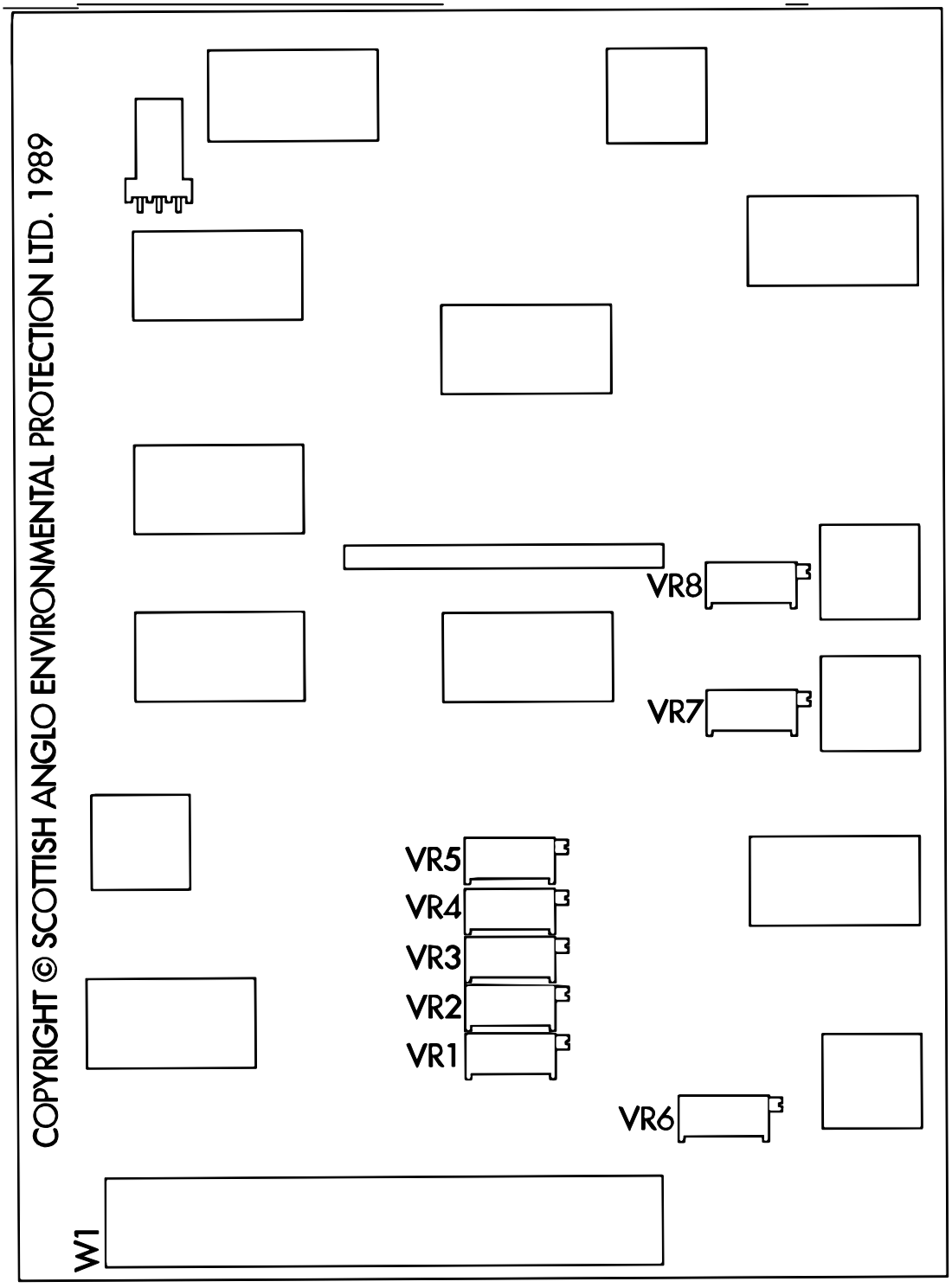
8.1.2 ADJUSTMENT PROCEDURE.

The potentiometer that requires adjustment is VR2. This is located on the main printed circuit board SA004B/1. Adjacent to the front panel is a line of five potentiometers, VR2 is the second potentiometer from the end nearest the front panel. (See drawing 8.1.4.)

8.1.3 RE-ASSEMBLY OF THE BOX

Place the top cover loosely in position, easing the front edge groove of the cover into the tongue on the instrument body. Press the top cover down and forward until the retaining latches ‘click’ into position. Replace the four securing screws in the base of the instrument and fit the rubber feet in the rectangular holes.

8.1.4 OVERLAY DRAWING



Warranty Information

We provide the following Warranties for the Analox 101D2:

A 2 year graded sensor warranty.
A 1 year electronics warranty.

In both cases the Warranty period runs from the date of our Invoice.

We warrant that the equipment will be free from defects in workmanship and materials.

The Warranty does not extend to and we will not be liable for defects caused by the effects of normal wear and tear, erosion, corrosion, fire, explosion, misuse, use in any context or application for which the equipment is not designed or recommended, or unauthorised modification.

Following a valid Warranty claim in accordance with the above, the equipment, upon return to us, would be repaired or replaced without cost or charge but in our discretion we may elect instead to provide to you whichever is the lesser of the cost of replacement or a refund of net purchase price paid as per our Invoice on initial purchase from us. We shall have no liability for losses, damages, costs or delays whatsoever. We shall have no liability for any incidental or consequential losses or damages. All express or implied warranties as to satisfactory or merchantable quality, fitness for a particular or general purpose or otherwise are excluded and no such Warranties are made or provided, save as set out in this Clause 7.

In order to effectively notify a Warranty claim, the claim with all relevant information and documentation should be sent in writing to:

Analox Sensor Technology Limited
15 Ellerbeck Court
Stokesley Business Park
Stokesley
North Yorkshire
TS9 5PT

Or by e-mail to : info@analox.net
Or by Fax to : +44 1642 713900

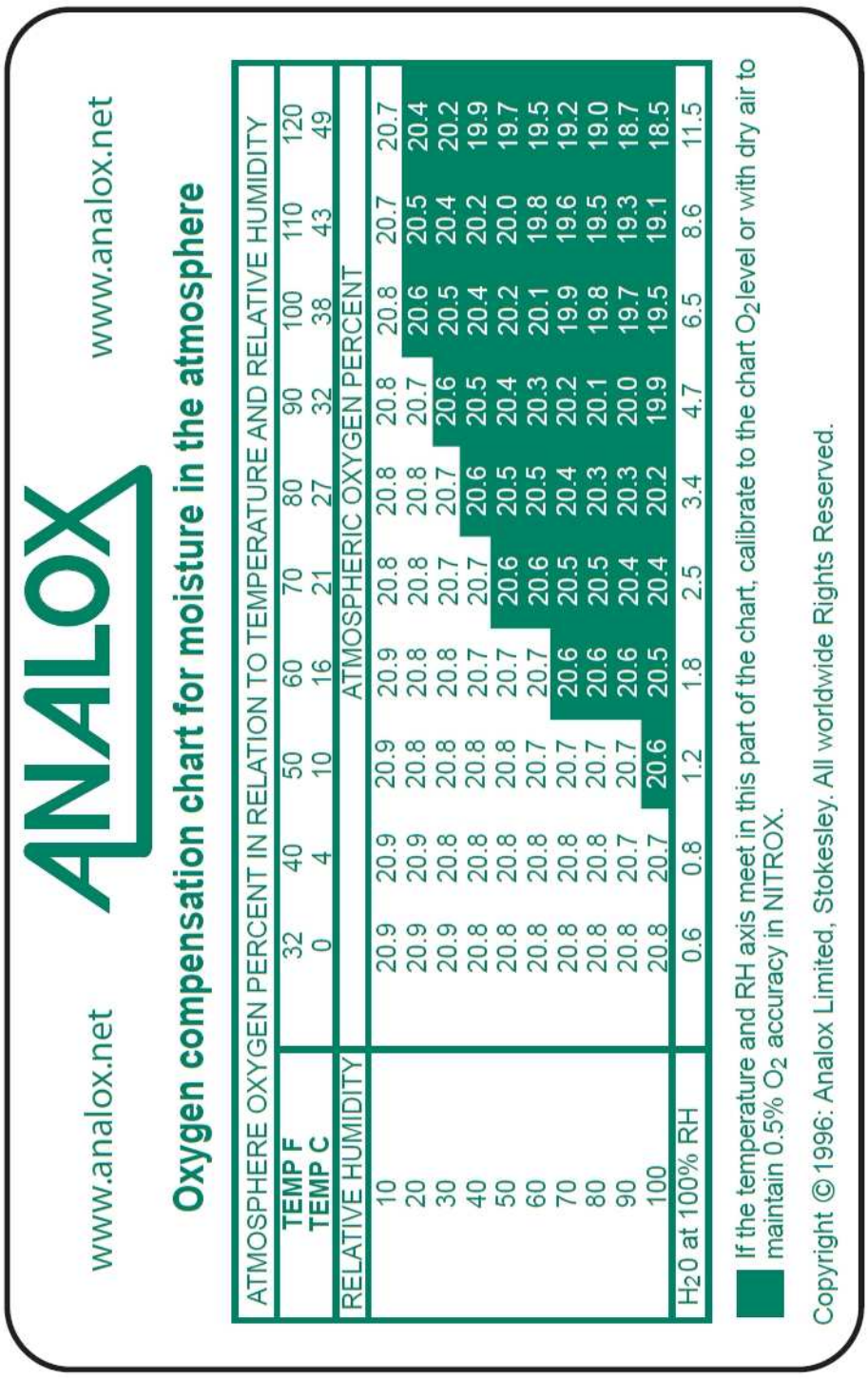
We reserve the right to require from you proof of dispatch to us of the notification of Warranty claim by any of the above alternative means.

The equipment should not be sent to us without our prior written authority. All shipping and Insurance costs of returned equipment are to be borne by you and at your risk. All returned items must be properly and sufficiently packed.

9 Specifications

Ranges	0.01% - 19.99% at Atmospheric Pressure 0.1% - 100.0% at Atmospheric Pressure
Minimum Reading	0.01% O2
Accuracy	± 1% of Readout
Temperature Effect	± 0.1% of Readout per °C
Sensor Life	2 years in Air (20.9%)
Battery	4 x MN1500 Alkaline Cells
Battery Life	Approx. 1 month of continuous use reducing with Alarm Activation
Dimensions	Depth Overall: 205mm Height Overall: 68mm Width Overall: 148mm Weight: 700gms (Incl. Battery)

10 Analox Oxygen Compensation Chart



www.analox.net ANALOX www.analox.net

Oxygen compensation chart for moisture in the atmosphere

ATMOSPHERE OXYGEN PERCENT IN RELATION TO TEMPERATURE AND RELATIVE HUMIDITY												
TEMP F	32	40	50	60	70	80	90	100	110	120		
TEMP C	0	4	10	16	21	27	32	38	43	49		
RELATIVE HUMIDITY	ATMOSPHERIC OXYGEN PERCENT											
10	20.9	20.9	20.9	20.9	20.8	20.8	20.8	20.8	20.7	20.7		
20	20.9	20.9	20.8	20.8	20.8	20.8	20.7	20.6	20.5	20.4		
30	20.9	20.8	20.8	20.8	20.7	20.7	20.6	20.5	20.4	20.2		
40	20.8	20.8	20.8	20.7	20.7	20.6	20.5	20.4	20.2	19.9		
50	20.8	20.8	20.8	20.7	20.6	20.5	20.4	20.2	20.0	19.7		
60	20.8	20.8	20.7	20.7	20.6	20.5	20.3	20.1	19.8	19.5		
70	20.8	20.8	20.7	20.6	20.5	20.4	20.2	19.9	19.6	19.2		
80	20.8	20.8	20.7	20.6	20.5	20.3	20.1	19.8	19.5	19.0		
90	20.8	20.7	20.7	20.6	20.4	20.3	20.0	19.7	19.3	18.7		
100	20.8	20.7	20.6	20.5	20.4	20.2	19.9	19.5	19.1	18.5		
H_2O at 100% RH	0.6	0.8	1.2	1.8	2.5	3.4	4.7	6.5	8.6	11.5		

If the temperature and RH axis meet in this part of the chart, calibrate to the chart O_2 level or with dry air to maintain 0.5% O_2 accuracy in NITROX.

Copyright © 1996: Analox Limited, Stokesley. All worldwide Rights Reserved.

Warning

These instructions should be read and understood by all individuals who will Be responsible for the operation of this analyser. The actions taken as a result of the measured Oxygen readings must be in strict accordance with the Company or Country regulations.